March 2022 Meeting of the Scientific Guidance Panel for Biomonitoring California

Summary of Input and Recommendations

The Scientific Guidance Panel (SGP) for the California Environmental Contaminant Biomonitoring Program (also known as Biomonitoring California) met virtually on March 25, 2022. This document briefly summarizes input and recommendations received from the Panel, as well as the range of topics discussed with the audience. Visit the March 2022 SGP meeting page to access the presentations, complete transcript, written public comments, and other meeting materials.

Program Update and Planning

Presentation: Nerissa Wu, PhD, MPH, California Department of Public Health (CDPH)

Topics discussed after this presentation included:

- Details regarding Biobank samples from the Genetic Disease Screening Program (GDSP), including:
    - The types of data that are available on prenatal screening program participants who provided Biobank samples, including some limited sociodemographic information (e.g., race/ethnicity, MediCal status, week of pregnancy, weight) and county of residence.
    - Possibilities for linking existing Biobank data with other datasets, such as prenatal to newborn records, and vital statistics.
    - It was noted that GDSP participants do not opt in to having their samples saved in the Biobank, they have to opt out. It would be difficult to change the process to ask participants if they would be willing to be contacted in the future for additional information relevant to Biomonitoring California studies.
    - The Program could consider partnering with the Center for Family Health, which includes the GDSP. The Program could brief the Center to demonstrate the strong link between Biomonitoring California's work and the Center's interests and clients.
    - Whether Biobank samples, which are serum samples, could be used to measure quaternary ammonium compounds (QACs).
        - At the present time, the Program has partnered with external collaborators to evaluate a method to measure QACs in urine and fecal samples, but not in serum.
- Biomonitoring California website updates currently underway, including transition to Drupal 9, and ideas for additional changes.
    - Adding a "For Researchers" tab on the landing page may be useful.
    - Exploring options for increased data access.
    - The Program welcomes any ideas for website updates to be sent to biomonitoring@oehha.ca.gov.

AB 617 Biomonitoring Update and Planning

Presentation: Susan Hurley, MPH, Office of Environmental Health Hazard Assessment (OEHHA)

Panel members discussed the following topics with staff presenters:

- Challenges in interpreting the results from the Stockton Air Pollution Exposure Project (SAPEP).
    - Air filtration units can be noisy, especially when run at a high setting. While school staff were instructed not to change the settings on the IQAir filtration units, compliance with this request is unknown.
    - Due to the COVID pandemic, SAPEP had fewer participants than planned, making statistical inferences difficult.
    - Complementary data from future biomonitoring studies, such as the **Biom**onitoring component of the **S**an Joaquin Valley **P**ollution and **H**ealth **E**nvironmental **Re**search Study (BiomSPHERE) will help in the interpretation of the results from SAPEP.
- The appropriateness of the timing of sample collection, with respect to the biomarkers measured.
    - Due to the short half-lives of the selected biomarkers, the time interval between the before- and after-school sample collection should be sufficient to detect changes in exposures.

Public comment:

- Dr. Ahimsa Porter Sumchai of the Hunters Point Community Biomonitoring Program encouraged the Program to add diesel particulates to the suite of toxic air contaminants (TACs) of major concern and noted that the Bayview community in San Francisco ranks in the 95th percentile for diesel particulate matter.
- Jef Esquivel, an audience member, commented “Regarding community concerns, metal shredding activities were noted. Perhaps other recycling shredding activities (paper and plastics) also may be beneficial.”

Open Discussion and Input

Facilitated by Ulrike Luderer, MD, PhD, UC Irvine

Discussion Questions

The Panel, staff presenters, and audience discussed a range of topics, including:

- Types of analyses the Program can conduct using data from existing samples.
    - Archived Biobank samples provide a unique opportunity for the Program to conduct time-trend analyses.
    - Time-trend analyses should be prioritized as they allow us to observe trends in populations and learn from past studies. They can also help evaluate the effectiveness of legislation or other interventions in reducing exposures.

    - Comparative geographic analyses would also be useful in identifying disparities in exposure among the current California population.
- Limitations to using the Biobank samples.
    - Biobank samples are only available for seven counties in California.
    - Cannot be used for metals analyses because the serum separator gel in the collection tubes contains trace levels of metals and measurements cannot adequately be corrected for contamination.
    - Sufficient sample volume may limit ability to measure certain compounds, such as persistent organic pollutants (POPs).
- Developing Requests for Information (RFIs).
    - The Program could consider developing two different RFIs; one on topics that address broader Program goals and one to address topics proposed by communities.
- Panel recommendations for identifying communities and ongoing collaborative opportunities for community biomonitoring studies.
    - Madison Park Neighborhood Association in Orange County, which is collaborating with UC Irvine, and has concerns about air pollution and contaminants from industrial sites.
    - San Ysidro border community, which is heavily impacted by traffic and associated air pollution, and has a project planned in the future which will collect indoor and outdoor air measurements.
    - Communities in the Los Angeles area, which are affected by air pollution from oil and gas drilling.
- Considerations in planning community biomonitoring studies.
    - The degree to which biomonitoring can add value beyond that provided by air monitoring data (e.g., ability to assess exposure by all routes, and to highlight exposure disparities in populations).
    - Cumulative burdens of chemicals and other stressors when identifying heavily burdened communities to study.
        - CalEnviroScreen can be used to identify hotspots of exposure, and this information can be paired with data on other stressors (e.g., disease prevalence and socio-economic status).
    - Given that motor vehicle emissions are a major source of air pollution in California, continuing methods development to identify diesel biomarkers and looking at disparities among vulnerable populations should be a focus.
- Opportunities for future biomonitoring surveillance work.
    - Newborn bloodspots from the Newborn Screening Program may provide representative data for Californians.

        - Over 90% of newborns in California have provided samples.
        - The Program could consider methods development and validation for using these blood spots in the future.
        - There is a new review by Barr et al. (2021) of the state of science of newborn blood spots, particularly for perfluoroalkyl and polyfluoroalkyl substances (PFASs) and POPs.
    - The breast milk biorepository could be a resource for biomonitoring of new and emerging chemicals.
    - Consider the possibility of using samples collected for COVID screening and surveillance for biomonitoring surveillance purposes.
        - *Program staff noted that it might be difficult to obtain appropriate consent for samples that have already been collected. This approach is something they could consider for a longer-term project.*
- The Program's capacity to measure 1-nitropyrene (1-NP).
    - *Program staff indicated that the Program's laboratories have not yet developed the capability to measure 1-NP but they acknowledged its importance and are exploring strategies to address this in the future.*
- Building upon results obtained from SAPEP.
    - The effectiveness of air filtration at reducing exposures in heavily burdened communities is of intense interest. Although it is a small study with some methodological constraints, the results from SAPEP can help inform the design of future, more powerful studies of air filtration effectiveness.
    - Program staff are continuing to engage with SAPEP's community partners to:
        - Better understand the ongoing use, or lack of use, of the IQAir filtration units that were donated to the school at the completion of the study.
        - Learn about the effectiveness of adding Minimum Efficiency Reporting Value (MERV)-13 filters, which were donated to the school for use in their Heating, Ventilation, and Air Conditioning (HVAC) system. The Program could evaluate the ongoing indoor/outdoor PM2.5 data provided by the PurpleAir sensors that are on school grounds and continue to run.
- Finding solutions to support community interventions and exposure mitigation strategies.
    - Biomonitoring results from SAPEP and future studies could be used to expand access to air filtration.
    - The Program could consider partnering with state geographers to look at tree coverage and green barriers as potential exposure mitigation strategies.
    - The Program could also look at California's adoption of clean diesel and disparities in exposures that could still exist across communities, such as near the border in San Diego.

Public comment:

- Dr. Ahimsa Porter Sumchai of the Hunters Point Community Biomonitoring Program commented that their program is looking at patterns of essential nutrient deficiencies to triangulate with toxic metal detections. She also provided the following comment: "Hunters Point biomonitoring will be meeting with Dr. Terry Hamilton who leads the

Marshall Islands Plutonium Biomonitoring Program for Lawrence-Livermore Laboratories next month. We have historical and environmental survey work that supports our belief we have a plutonium exposed population at the Hunters Point Naval Shipyard federal superfund system, where up to 90 Operation Crossroads ships were docked. The Navy has detected Plutonium 238 and 239 in concentrations 44 times higher than background. I raise this point for two reasons. Given world events, we should be looking at biomarkers of radiation exposure. And I also want you to look at the very sensitive and specific mass spec capabilities at Lawrence-Livermore and Los Alamos UC facilities."

- Sharyle Patten, Director of the Commonweal Biomonitoring Resource Center, commented that the National Defense Authorization Act authorized funds for states regarding PFASs clean-up and included funds for biomonitoring military personnel living on site. The Program may be interested in looking at this population. Additionally, firefighters are concerned with exposures to chemicals that adhere to particulate matter in smoke. These exposures are of concern to the general population as well.

Report Back on Buck et al. (2011)[1] Definition of Perfluoroalkyl and Polyfluoroalkyl Substances (PFASs)

Presentation: Sara Hoover, MS, OEHHA

Topics discussed in the question period after this presentation included:

- The need for additional data to justify the addition of partially fluorinated aromatic compounds to the definition of PFASs.
    - *Program staff reiterated that any proposed change to the PFASs definition would be voted upon by the Panel at a future meeting.*
- Chemical characteristics that may indicate higher toxicity of certain PFASs chemicals.
    - PFASs are a large class of compounds, and many have not yet been studied or characterized fully.
    - Advancements in analytical methods are increasing detection of fluorinated organic chemicals, but the toxicity data for these chemicals is not yet well characterized.
- The Program's proposal to broaden the class definition for PFASs.
    - A broader definition provides flexibility for the Program to identify potential chemicals of concern.
        - *Program staff noted that they are not required to measure every chemical that may be captured by a broader definition of PFASs.*
        - Non-targeted screening could be used to identify previously unknown fluorinated chemicals.
    - Adopting a narrower definition may restrict the Program's ability to address emerging PFASs of concern.

[1] Buck RC, Franklin J, Burger U, et al. (2011). Perfluoroalkyl and polyfluoroalkyl substances in the environment: terminology, classification, and origins. Integr Environ Assess Manag 7(4):513–541 (link to free article: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3214619/).

    - Adding a class of chemicals to the Program's list of designated chemicals does not necessarily indicate toxicity, but allows the Program to address potential issues of concern, including increased exposures, as new information on toxicity and exposures becomes available.
- Factors to consider when developing the PFASs definition.
    - The persistence, toxicity, and mobility of PFASs.
- Importance of consistency with existing definitions of the class of PFASs.
    - The Organisation for Economic Co-operation and Development (OECD) and California Senate Bill (SB) 1044 PFASs definitions are both widely used.
        - *The Program noted that the OECD and SB 1044 definitions are not as broad as the Buck et al. definition, and clarified that the Program is interested in broadening the Buck et al. definition to include more chemicals, rather than being more restrictive. There is a great deal of inconsistency in the literature and in the existing definitions.*
- Next steps for updating the PFASs definition.
    - The Program will update the PFASs footnote on the lists of designated and priority chemicals to remove the moiety requirement.
    - The Program will develop a revised PFASs definition, based on input from stakeholders and the Panel, which will be voted upon at a future SGP meeting.

Public comment:

- Stephen Brown, a PhD chemist leading the Sierra Club's PFASs grassroots action team, submitted a comment as a private individual on the topic of defining PFASs as a chemical class. He submitted a summary prepared by the European FluoroCarbons Technical Committee which is available on the March SGP meeting page. He stated that "I would opt for the definition provided by Denmark, Germany, the Netherlands, Norway and Sweden in the PFAS Registry of Intentions (ROI), which is most restrictive, but which may not be accepted ultimately by OECD. Manufacturers will prefer consistency worldwide, so the OECD definition would be acceptable, if it isn't revised per the ROI proposal. The California SB 1044 definition would lead to ambiguity."
- Amy Kyle, Associate Adjunct Professor at UC Berkeley, recommended that OEHHA:
    - Ensure the PFASs definition reflects the evolving understanding of this diverse and ubiquitous class.
    - Write up an analysis of the strengths and weaknesses of various approaches for defining the class.
    - Consider the PFASs definition used in SB 1044, as it is increasingly being used in California legislation and elsewhere.
    - Consider which definitions would be most functional for addressing compounds that are not fully characterized.
- Avi Kar, an attorney with the Natural Resources Defense Council, urged the Panel to consider consistency with existing PFASs definitions, such as the SB 1044 and OECD definitions.
- Nancy Buermeyer of Breast Cancer Prevention Partners expressed support of a broad PFASs definition. She also noted that the chemical lists that Biomonitoring California

publishes are used by the California Legislature, specifically in some disclosure bills around cleaning products and fragrances. Therefore, the more broad the definition, the more chemicals would be disclosed for these purposes as well. Polymers, including polytetrafluoroethylene (PTFE), should also be captured in the definition.

- Renee Sharp of Safer States commented on the importance of consistency when updating the PFASs definition. She also expressed support for keeping the definition as broad as possible. If the definitions used in SB 1044 or the OECD are not broad enough, the Program should consider building upon one of these definitions rather than using the older definition provided by Buck et al.

Open Public Comment

Submissions from Dr. Ahimsa Porter Sumchai:

HP Biomonitoring: Promising HOPE for Hunters Point
HOPO: Partnering to Advance Therapy for Radiation Exposure
Quest to Detect Plutonium